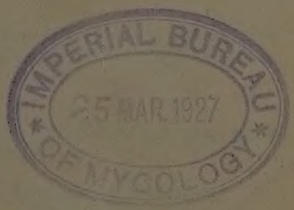
Rubber Research Scheme

(CEYLON.)

Fourth Quarterly Circular

FOR

1926.



Peradeniya, December, 1926.

GENTLEMEN,

Herewith the Fourth Quarterly Circular for 1926, dealing with the following subjects :—

"Employment of Flood Water to repair the damage previously caused by it."

By R. A. Taylor, Physiological Botanist.

"Some remarks concerning storing and packing of budding wood."

Extract from paper by Dr. J. C. J. A. Maas.

"On the effect of Paranitrophenol on the plasticity, vulcanising, and ageing properties of blanket crepe."

"On the effect of Bordeaux Mixture on the properties of Plantation Rubber."

Received from the London Advisory Committee.

Note on "Pollarding of Trees for Bud-Wood."

Department of Agriculture Press Communique.

Reports received.

J. MITCHELL,
Organising Secretary.

RUBBER RESEARCH SCHEME (CEYLON),
Peradeniya, 31st December, 1926.

"EMPLOYMENT OF FLOOD WATER TO REPAIR THE DAMAGE PREVIOUSLY CAUSED BY IT."

Owing to silting up at the mouths of one or two of the rivers in Ceylon, there are estates situated along the banks of these rivers which have areas subject to periodical flooding. Some of these areas suffer through the actual overflowing of the river banks, and others are flooded by local water which is unable to find an outlet owing to the swollen nature of the rivers during the Monsoon rains.

In certain cases these areas become silted up with material brought down by small streams from the higher portions of the estate, and with debris from the river, and are often of a very swampy nature. Consequently the soil is usually good and would support a good growth of rubber if properly drained. On the other hand these conditions are very favourable for the spread of root diseases such as are caused by *Sphaerostilbe repens* or by *Kretzschmaria micropus*. Many trees are lost as a consequence and often develop large fructifications of *Kretzschmara micropus* alone or in combination with *Ustulina Zonata*.

In other cases the flood water from local rains courses over areas because of the inability of the usual water courses to carry off the quantity of water coming down the slopes. In this manner large areas are denuded of their top soil, which is carried away to the lower flats, and the trees are left with all their sideroots exposed.

The most obvious remedy for this would be to have the natural water courses deepened or widened but such a course would not replace any of the lost soil. A method of terracing has, therefore, been devised which allows the flood water with its contained silt free access to the area but is forced to drain slowly away through an arranged channel. Much of the silt is in this way dropped and after one or two operations

of this kind sufficient material is deposited to completely cover every exposed root in the area.

Later on one of the terrace walls is increased in height and a part of one or other of the water courses is cleaned out and this prevents anything but a very high flood from inundating the area and a deep drain is cut so as to lower the permanent water level. As will be seen from the photographs the treated area presents a much more satisfactory appearance; the trees are now embedded in the soil to the normal depth, and none of the side roots are exposed.

Plate No. 1 shows a fairly swampy area still to be treated. Plate No. 2 shows a treated area in which no roots can be seen. The stone terraces are shown to the right and in the back ground of this Plate. Plate No. 3 shows an untreated area with many roots well above the present surface of the soil. Plate No. 4 shows an undrained swampy area which has been the dumping ground of silt and vegetable debris brought down by a small stream, but which, from the appearance of roots, must have previously been depleted of much of its top soil.

No plan of the area treated is given as the treatment varies in each particular block. The position of the usual and exit of flood water has to be studied and the terraces arranged accordingly.

R. A. TAYLOR,
Phy. Botanist.

RESEARCH SCHEME LABORATORIES,
CULLODEN,
NEBODA,
7th October, 1926.

Plate 1

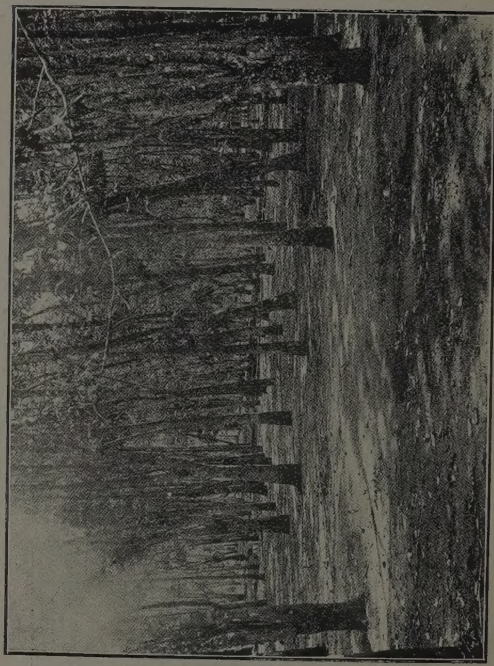


Plate 2.

Plate 3.

Plate 4.

UMMARY OF PAPER "SOME REMARKS CONCERNING STORING AND PACKING OF BUDDING WOOD."

By Dr. J. G. J. A. Maas.

Extracted from Archief Voor de Rubberculture. No. 3, 1926.

. If the buddingwood is used within one week after cutting:

1. young wood is as good as old;
2. paraffining—at least old wood—is not necessary;
3. banana leaf sheaths are a quite suitable and easy packing material;
4. nevertheless it is desirable to use the wood as quickly as possible;
5. the placing of the branches with the lower ends in water, to be refreshed daily, during the time between arrival and use, is to be recommended. It goes without saying that the paraffin and a small part of the ends of paraffined branches should be removed before placing them in water.

If more than one week must elapse between cutting the wood and actual use:

1. old wood should be used exclusively;
2. the ends of the wood should be paraffined;
3. the small bundles should be wrapped, *e.g.*, in jute bags (better than banana leaf sheaths, which rot during transport);
4. The wrapped up wood should be packed in closed chests;
5. the intervening spaces between the bundles of branches should be filled with moist charcoal;
6. on arrival on the estate the paraffin and a small piece of wood should be immediately removed and the branches placed in water till the moment it is used, the water to be refreshed daily.

If the wood is cut in the afternoon., it is probably desirle to place it in water during the night and to pack the xt morning.

REPORT ON THE EFFECT OF PARA-NITROPHENOL ON THE PLASTICITY, VULCANISING, AND AGEING PROPERTIES OF BLANKET CREPE.

In connection with experiments carried out in Ceylon to determine the efficacy of paranitrophenol as a mould preventive, several sets of blanket crepe were forwarded to the Imperial Institute for inspection, chiefly with a view to noting the effect of paranitrophenol on the colour.

Some of the samples were prepared by dipping the crepe in a solution of paranitrophenol and others by adding the paranitrophenol with the acetic acid. In every case, the samples containing paranitrophenol were slightly darker than the corresponding controls on arrival at the Imperial Institute.

It was thought that it would be of interest to determine what effect, if any, the presence of paranitrophenol has on the plasticity, vulcanising, and ageing properties, and one of the sets of blanket crepe was examined for this purpose. It consisted of three samples from the same latex, viz.:—

(1) Control, (2) dipped in 0·1 per cent. paranitrophenol solution for 30 minutes and (3) prepared by coagulating with a mixture of acetic acid and paranitrophenol.

The results of the tests show that all the samples were rather more plastic than the samples of estate air-dried blanket crepe so far examined, and that those containing paranitrophenol were similar to the control.

The samples vulcanised at the usual rate for crepe No. 1263, coagulated with a mixture of paranitrophenol and acetic acid, was a little quicker than the other two.

The ageing properties of all three samples were satisfactory in comparison with ordinary crepe, the paranitrophenol having no appreciable effect.

Details of the results are given below.

(1) Plasticity Tests.

Sample No.	Form of Rubber.	Time of mastication for power consumption of 450 watt hours.	Time of mixing for power consumption of 150 watt hours.	Plasticity.				
				Raw Rubber.	Masticated Rubber.		Rubber-sulphur Mixing (90 : 10).	
		(mins.)	(mins.)	D 30*	D 30*	Et†	D 30*	Et†
1261	Blanket crepe (control) ...	23½	11	167	80	70·8	72	43·6
1262	Blanket crepe soaked in 0·1 per cent. paranitrophenol for 30 mins. ...	23½	11	171	86	72·5	73	46·6
1263	Blanket crepe from latex coagulated with acetic acid and 0·1 per cent. paranitrophenol (calculated on dry rubber) ...	22½	10½	174	87	75·3	72	46·5

*D30 = Thickness (in hundredths of a millimetre) of sphere 0·4 gram in weight after pressing in plasticity press at 100°C for 30 minutes.

†Et = Time (in minutes) required to extrude fixed volume at 90°C.

(2) Vulcanising and Ageing Tests.

Sample No.	Form of Rubber.	Time of vulcanisation	Period of ageing at 70°C.	Tensile Strength.	Elongation at load of 1·04 kgs./sq. mm.
		(mins.)	(hrs.)	(lbs./sq. in.)	(per cent.)
1261	Blanket crepe (Control) ...	120	nil	1780	890
			48	2240	793
			96	1880	749
			144	280	—
1262	Blanket crepe soaked in 0·1 per cent. paranitrophenol for 30 mins.	120	nil	1910	887
			48	2080	786
			96	1790	744
			144	340	—
1263	Blanket crepe from latex coagulated with acetic acid and 0·1 per cent. paranitrophenol (calculated on dry rubber)	120	nil	2120	860
			48	2390	768
			96	1680	726
			144	330	—

IMPERIAL INSTITUTE,
LONDON, S. W. 7.
7th October, 1926.

REPORT ON EFFECT OF BORDEAUX MIXTURE ON THE PROPERTIES OF PLANTATION RUBBER.

FOREWORD.

It should be emphasised that this report deals with a laboratory experiment designed to determine the effect of adding certain specific quantities of Bordeaux mixture to latex before coagulation.

It is not intended to suggest that latex from sprayed areas is contaminated with Bordeaux mixture.

T. E. H. O'B.

It was found in previous experiments that crepe prepared from latex collected two or three days after the tapping side of the trees had been sprayed with Bordeaux mixture (a mixture of copper sulphate and lime) became softer on keeping than estate grades of plantation rubber, and had poor ageing properties when vulcanised. Chemical analysis showed that this rubber contained about 1 part of copper per 100,000 parts, which was undoubtedly the cause of the deterioration of both the raw and vulcanised product.

In continuation of this investigation, experiments have been made with a view to determining the effect of adding different amounts of Bordeaux mixture to latex previous to coagulation. Two sets of samples of crepe were prepared for this purpose by the Chemist in Ceylon containing respectively (1) from 0·2 to 5·0 and (2) from 0·02 to 0·5 per cent. of Bordeaux mixture.* See Footnote No. 1.

Six months after preparation some of the samples were found to be distinctly soft and tacky, those prepared from latex containing the most Bordeaux mixture being the worst in this respect. Those containing the least Bordeaux mixture appeared to be similar to the control.

Results of Examination.

Amount of copper.—The amount of copper in each sample was determined with the results shown in the table on page 15.

Only a small part of the copper added to the latex as Bordeaux mixture was found in the crepe, and when 0·05 per cent. or less of Bordeaux mixture was added the amount of copper, if any, was too small to be indicated by the colorimetric method employed, which will not detect the presence of less than 0·05 parts of copper per 100,000 parts. On the whole the larger the amount of Bordeaux mixture added to the latex the greater the quantity of copper found in the rubber.

Plasticity.—The relative plasticity of the samples was determined by noting—

(a) The thickness of spheres weighing 0·4 gram of (1) the raw rubber and (2) the rubber-sulphur mixing, after pressing under a load of 5 kgs. for 30 minutes at 100°C; and

(b) The time required to extrude a fixed volume of the rubber-sulphur mixing through a small orifice at 90°C.

The following are the results obtained.

[*For Table see page 15.*]

Sample No.	Bordeaux mixture added to latex.	Copper found in crepe.	Time of mastication for power consumption of 450 watt hours.	Time of mixing for power consumption of 150 watt hours.	Plasticity.		
					Raw rubber.	Rubber-sulphur mixing (90:10).	
	(per cent.)	(parts/100,000)	(mins.)	(mins.)	D30	D30*	Et.†
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1246	0·20	0·4	25	9	148	60	26·0
1247	0·50	1·0	28	11½	119	54	17·2
1248	1·00	12·0	29	11	90	51	12·1
1249	2·00	4·8	45	17	55	39	4·9
1250	5·00	60·0	Very tacky, so sulphur was mixed in quickly.		20	18	1·1
1251	nil (control)	not detected	21	10	157	56	38·1
1252	" "	" "	23	10	156	54	45·3
1253	0·02	" "	20	9	143	52	34·8
1254	0·05	" "	20	10	159	46	35·2
1255	0·10	0·8	23	11	160	52	33·5
1256	0·20	2·4	22	11	157	56	29·3
1257	0·50	4·0	27	12	126	59	21·5

*D30=Thickness (in hundreds of millimetres) of sphere 0·4 grams in weight after pressing in plasticity press at 100°C for 30 minutes.

†Et=Time in minutes required to extrude fixed volume at 90°C.

The tests indicate that eight months after preparation the samples containing the largest quantities of Bordeaux mixture were very soft and plastic. This confirms the opinion formed on inspecting the samples six months after preparation.

It will be seen from column 8 of the table above that the crepe prepared from latex containing as little as 0·02 per cent of Bordeaux mixture extrudes more quickly than the controls. The plasticity press however is not sufficiently delicate to indicate the slight difference in plasticity (*see* column 7).

Ageing properties.—The samples were vulcanised in the rubber-sulphur mixing 90 : 10, and their mechanical properties determined before and after ageing artificially at 70°C (*see* Bulletin 41, p. 3). The following are the results obtained.

[*For Table see page 17.*]

Sample No.	Bordeaux mixture added to latex.	Copper found in rubber.	Time of cure.	Ageing period at 70°C.	Tensile Strength.	Elongation at load of 1·04 kgs./ sq. mm.
	(per cent)	(parts/ 100,000)	(mins.)	(hrs.)	(lbs./ sq. in.)	(per cent.)
1246	0·20	0·4	125	nil	1870	850
				48	1350	—
				96	240	—
1247	0·50	1·0	125	nil	1670	885
				48	297	—
1248	1·00	12·0	135	nil	1600	856
				48	200	—
1249	2·00	4·8	145	nil	1370	—
				48	200	—
1250	5·00	60·0	—	Maximum tensile strength 300 lbs./ sq. in.		
1251 (Control)	nil	not detected	120	nil	1800	879
				48	1880	746
				96	450	—
1252 (Control)	nil	not detected	100	nil	1810	858
				48	2140	770
				96	1600	—
				144	300	—
1253	0·02	not detected	120	nil	1840	862
				48	2000	760
				96	1410	—
				144	260	—
1254	0·05	not detected	120	nil	1760	861
				48	1960	760
				96	350	—
1255	0·10	0·8	120	nil	1630	852
				48	1950	744
				96	1520	—
				144	230	—
1256	0·20	2·4	122	nil	1730	875
				48	2140	738
				96	330	—
1257	0·50	4·0	125	nil	1640	870
				48	1140	—
				96	190	—

Except in the case of the samples made from latex containing the largest quantities of Bordeaux mixture, which were very soft and tacky before vulcanisation, the presence of copper in the rubber has had no effect on the time of vulcanisation and very little effect on the tensile strength before ageing. The artificial ageing properties of all the samples prepared from latex containing Bordeaux mixture are however inferior to the corresponding controls. In the case of samples prepared from latex containing 0·10 per cent. or less of Bordeaux mixture the inferiority is only slight. In the other samples the inferiority is marked and increases with the amount of Bordeaux mixture.

The ageing properties of one of the controls is inferior to those of other crepes previously examined, and both controls extrude more quickly than air-dried crepe examined in connection with other experiments.

Conclusions.

1. Only a small proportion of the copper added to latex as Bordeaux mixture is found in the crepe.

2. The presence of 0·02 per cent. of Bordeaux mixture in the latex or of less than 0·00005 per cent. of copper in the raw rubber is sufficient to cause the latter to soften and become tacky on keeping and to weaken more rapidly after vulcanisation.

3. On the whole the larger the amount of Bordeaux mixture in the latex, the greater the quantity of copper found in the crepe and the quicker the deterioration of the raw and vulcanised products.

IMPERIAL INSTITUTE,
SOUTH KENSINGTON, LONDON, S. W. 7.
1st October, 1926.

Footnote No. 1.

The figure for percentage of Bordeaux Mixture added to the latex refers to the amount of diluted Bordeaux per 100 grams of rubber present in the latex. 1 % of Bordeaux therefore corresponds to approximately 2-5 parts Copper per 100,000 of rubber if absorption is complete.

Amount of Copper added to the latex.

% Bordeaux Mixture.	Copper per 100,000 parts rubber.
5 %	12.8
2 %	5.12
1 %	2.56
0.5 %	1.28
0.2 %	0.51
0.1 %	0.26
0.05 %	0.128
0.02 %	0.05

—T. E. H. O'B.

Footnote No. 2.

The above experiments demonstrate the need for extreme caution in handling copper preparations in factories owing to the deleterious effect of minute quantities of copper.

—T. E. H. O'B.

NOTICE.

POLLARDING OF TREES FOR BUD-WOOD.

It has been emphasized that the best results are only to be secured when bud-wood is in a satisfactory condition. This means that the high yielders have to be pollarded. Experience upon one estate which has pollarded a number of trees has shown that 70% of these pollarded trees have developed large sun cracks on their roots and in these cracks various fungi can at present be found. It is therefore important that when trees are pollarded for the purpose of securing bud-wood all exposed roots should be carefully covered before the top shade is removed.—*Department of Agriculture, Ceylon, Press Communique.*

REPORTS RECEIVED.

Report on "The effect of paranitrophenol on the plasticity, vulcanising, and ageing properties of blanket crepe" from the London Advisory Committee. This is included in the present Circular.

Report on "The effect of Bordeaux Mixture on the properties of Plantation Rubber" from the London Advisory Committee. This is included in the present Circular.

Report on "Unsmoked 'Smoked' Sheet" from the London Advisory Committee. Further trials are to be carried out in this connection before the results are published.